The Effect of Knowledge Management Capabilities on Project Management Success

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ABSTRACT
Nowadays, the utilization of Knowledge Management (KM) is essential for modern organizations that are striving to fulfill their stakeholder's expectations, enhance business performance, and build a high reputation in global competitions by ensuring projects being delivered on time with planned budgets. However, there is a significant gap in the existing literature to address the core role or effect of knowledge management to the project management and to its practices. Therefore, it is pivotal for such organizations to explore and learn what KM capabilities are and what their impacts onto the organizations' PM are. This paper aims to reveal the effect of KM capabilities, specifically the KM processes and the KM infrastructure. Which are considered as important elements that enable the Project Management (PM) gaining and achieving a high organizational success. After explaining the theoretical concepts of KM, its capabilities as well as PM, it discovers and elaborates the effects that the KM capabilities may lead in PM practices in organizations. It argues that establishing KM capabilities would contribute to the PM practices for the sake to have a recognized business functionality and advanced degree of the projects' success. It implies that identifying the effect of KM capabilities in PM has the potential to enhance the organizational performance and achieve strategic goals in ongoing and future project activities.

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1. INTRODUCTION

Knowledge Management (KM) as a discipline has been a focal point of discussion over the past decades. In recent years, the importance of KM has been widely recognized as the foundations of industrialized economies shifted from natural resources to intellectual assets (Omotayo, 2015). KM has been recognized as a critical factor for both organizational performance and project success (Kotnour, 2000; Koskinen and Pihlanto, 2008).

Due to higher demand for Project Management (PM) and its practices, numbers of PM methodologies and standards have been developed by practitioners and academics since the late 1990s to assist organizations to improve their project performance (Kerzner, 2004; PMI, 2013). In fact, PM is a critical practice in the globalization movement that has transformed the project methodology in the

past ten years from insufficient practices to a recognized and well-managed practices. Based on Kliem (1999), KM makes an excellent candidate for project management, where it has a significant role in improving the rate of project success through both creating and capturing the appropriate knowledge for the PM practices and, then, facilitating and applying this knowledge to those practices by project team members in the organizations. Thus, KM has potential effects on the PM in the organizations.

However, there is a significant gap in the existing literature to address the core role or effect of knowledge management in the project management and its practices (Karapetyan and Rosemary, 2011). In other words, the existing conducted researches are neither having identified the importance of KM from the PM point of view nor addressed what are the KM capabilities' effects towards PM in the organizations for improving their projects. According to Sin, Goh and Eze (2009) and Polyaninova (2011), KM has a significant influence on the success or failure of an organization; thus, this paper is intended to discover what are KM capabilities that may affect leading to success or failure of project management. There are three sections in this paper, starting with reviewing PM, KM and followed by identifying the KM capabilities that have significant effects on the organizational project management.

2. LITERATURE REVIEW

2.1 Project Management (PM)

In the rapidly changing environment, project management has become an essential requirement for the survival of most organizations today. Project management approach is a well-developed system that can enable organizations to meet their goals in a timely fashion FM (2015). Lock (2007) in his book stated that Project Management (PM) is used to predict as many dangers and problems as possible and to plan, organize and control activities so that projects are completed successfully in spite of all risks that may come up during the project life cycle.

The Project Management Institute, PMI (2013) defined the PM as "the application of knowledge, skills, tools, and techniques to project activities to meet the project requirement". In general, PM helps people involved in the projects, as it provides them with step-by-step activities, inputs, outputs and tools that can be used at each of project phases. One of the main essentials and principles that PM deals with during the project activities is an application of knowledge, having the right knowledge that can be used at the right time in order to facilitate and support the project success. Knowledge is being created, converted and used throughout the project management process and in all phases of the project lifecycle FM (2015). As a result, project management has become an essential part of the organization's priority to manage and run their projects.

2.2 Knowledge Management (KM)

Through KM, organizations seek to acquire or create potentially useful knowledge and to make it available to those who can use it at a time and place that is appropriate for them to achieve maximum effective usage in order to positively influence organizational performance (William R. King, 2009). King has defined knowledge as a "justified personal belief." According to (Omotayo, 2015), knowledge is the insights, understandings, and practical know-how that people possess; there are many taxonomies that specify various kinds of knowledge.

Magnier-Watanabe and Senoo (2008) have defined Knowledge Management as the process for acquiring, storing, diffusing and implementing both tacit and explicit knowledge inside and outside the organization's boundaries with the purpose of achieving corporate objectives in the most efficient manner. While (Mahdi, Almsafir and Yao, 2011) and (Yao and Abdalla, 2013) defined KM as a systematic process of managing knowledge mainly from searching, creating, organizing, sharing, facilitating and evaluating aspects by utilizing technologies to help in the decision making of sustaining competitive advantage. Knowledge management could be defined as a process that transforms individual knowledge into organizational knowledge (Rasula, Vuksic and Stemberger, 2012). Over the centuries, many attempts have been made to classify knowledge, and different fields have focused on different dimensions. Nowadays, Organizations strive their power managing the knowledge involved in the project management activities, and there are two major types of knowledge.

Tacit knowledge: It tends to reside within the heads of people, who have the knowledge and it is difficult to articulate and difficult to put into words, text, or drawings (Hedesstrom and Whitley, 2000). It is being the most valuable source of knowledge, and the most likely to lead to breakthroughs in the organization. It includes cultural beliefs, values, attitudes, mental models as well as skills, capabilities and expertise. Goffin *et al.* (2010) have recommended that, an appropriate utilization of tacit knowledge is the key for project success.

Explicit knowledge: It represents content that has been captured in some tangible form such as words, audio recordings, or images (Omotayo, 2015). This is the type of knowledge most easily handled by knowledge management system as it formed in databases, memos, notes, documents, it usually contained within tangible or concrete media. The table below shows the difference between these types.

According to Love, Irani and Edwards (2010), KM has a strong influence on the efficiency of PM, in which poor utilization of KM practices not only negatively affects project success, but also causes some inefficiency such as overrun cost. Robert, Rachelle and Teri (2007) stated that, KM has been presented as a practice that makes sense for improving PM. Therefore, management of knowledge, whether explicit or tacit, is a necessity for a project success in today's changing environment (Polyaninova, 2011). Therefore; KM is viewed as the way to enhance productivity and increase profitability if knowledge assets are used effectively in each organization (Levin and Rad, 2007).

2.3 Knowledge Management Capabilities

From the definitions of KM mentioned above, two focuses could be extracted. The first one talks on acquiring, storing, diffusing and implementing of the organizational knowledge and all of these are called knowledge management processes; the second one of the definition states the location, boundaries and conditions of getting this knowledge and this is so-called KM infrastructure. Gold *et al.*, (2001) have developed a model of KM based on the capabilities perspective. They refer to four KM processes, acquisition, conversion, application, and protection of knowledge throughout the organization. These processes enable the organization to capture, reconcile, and transfer knowledge in an efficient and protected manner. In order to manipulate these processes, they refer to three key infrastructure capabilities: technology, structure, and culture. Together, the perspectives of infrastructure and processes provide a useful theoretical foundation for defining important aspects of knowledge effectiveness in organizations (Zaied, Hussein and Hassan, 2012).

2.3.1 Knowledge Process Capabilities

Acquisition Process- Acquisition process is a process that involves in obtaining and creating knowledge. However, prior to acquisition, an organization must know the knowledge it has within the organization in some form or other, and the knowledge gaps. Along with knowing the current position, an organization should make efforts to acquire knowledge and create new knowledge by using processes and tools (Bharadwaj, Chauhan and Raman, 2015). The interaction between the individuals will promote learning and make collaboration between individuals, which will lead to create new knowledge (Gareth and Cicmil, 2016). However, the ability to acquire knowledge is partly based on an organization's absorptive capacity.

Conversion Process- Conversion process in KM is an oriented process towards making existing knowledge available at a central location, easily accessible by everyone in the organization. Some of the processes that enable knowledge conversion are organization's ability to organize, integrate, combine, structure, coordinate and store knowledge. It is important and recommended for organizations to store and convert knowledge in a user-friendly, easily accessible form. Explicit knowledge can be stored as best practices or lessons learned databases. For tacit knowledge, the conversion process makes available corporate portals for accessing the expertise locator system (Nawab *et al.*, 2015).

Application Process- Knowledge application process refers to the process of sharing the knowledge among the employees in an organization and it can be considered as the core task of knowledge management (Rabbi, Zandi and Farrukh, 2015). Knowledge is effectively applied during the developmental processes of an organization through rules and directives, routines and self-organized teams (Sandhawalia and Dalcher, 2011). Using text mining techniques to mine relevant knowledge is

characteristic of knowledge application of unstructured knowledge. Using intelligent agents to actively build user profiles and push appropriate lessons learned and material to user is another way of knowledge application. Chat rooms, bulletin boards, online communications, communities of practices, etc., on organization intranet also facilitate knowledge sharing (Bharadwaj, Chauhan and Raman, 2015). However, for tacit knowledge sharing, the knowledge conversion process makes available corporate portals for accessing the expertise.

Protection Process- knowledge protection is a process or action towards protecting the knowledge from any attack or misuse as the organizational knowledge is vulnerable Bharadwaj, Chauhan and Raman, (2015) stated that knowledge must be protected from inappropriate use inside the organization by using logins and authentication to access systems, also protecting knowledge from inappropriate use outside the organization when sensitive information is requested from other party in the organization (Bharadwaj, Chauhan and Raman, 2015). Restrict access to employees to maintain knowledge confidentiality, protect employees' identities to sustain sharing of embedded knowledge and to establish the importance of protecting knowledge.

2.3.2 Knowledge Infrastructure Capabilities

Technology- According to Gold *et al.* (2001), technology comprises a crucial element of the structural dimension needed to mobilize social capital for the creation of new knowledge. Technology is able to overcome the barriers of time and space that would otherwise be limiting factors in KM activities. It also serves as a repository in which knowledge can be reliably stored and efficiently retrieved. Information technologies like e-mail, repositories, intranet portal, teleconferencing, and the activities of mentoring, collaboration and training play a key role in transferring knowledge (Sandhawalia and Dalcher, 2011).

The entire technology infrastructure used in organizational knowledge management systems is tangible and it acts as an enabler for facilitating KM initiatives in the organizations. According to Meso and Smith (2000) cited by Bharadwaj, Chauhan and Raman (2015) technology infrastructure comprises the hardware, software, middleware, and protocols that allow for the encoding and electronic exchange of knowledge.

Structure- According to Gold *et al.* (2001) structure is defined as the rules, policies, procedures, and processes, hierarchy of reporting relationships, incentive systems, and departmental boundaries that organize designs within the organization. Organizations most frequently group their employees based on knowledge and skills, work process and function, time, output, client, or place. An organization's structure is largely determined by the variety one finds in its environment. Organizational structure capability for facilitating the flow of knowledge is shaped by an organization's policies, processes, and

system of rewards and incentives, which determines the channels from which knowledge is accessed and how it flows Sandhawalia and Dalcher (2011). Hasanali (2002) highlights that structure as one among five critical success factors for KM. Organization structure is an important infrastructure to the team for facilitating and steering role in developing the culture of knowledge (Pandey and Khare, 2012).

Culture- In general, the culture was defined as a complex whole which includes knowledge, belief, art, morals, law, custom, and any other capabilities and habits acquired by the human as a member of society (Bharadwaj, Chauhan and Raman, 2015). The organizational culture is very important in leveraging KM. It has been considered both as a facilitator and a hurdle/barrier for effective KM. Culture of an organization has a key influence on KM, more specifically, on the effectiveness of knowledge in an organization. The knowledge culture is only specific for its own where it has defined as a type of organizational culture that influences the knowledge management processes. Rabbi, Zandi and Farrukh (2015) stated that, it is the culture that determines which knowledge to be shared, with whom it could be shared and when it should be shared.

3. METHODOLOGY

A systematic literature review was conducted to understand the main concepts of knowledge management and project management and their definitions. According to Gough, Oliver and Thomas, 2012), a systematic review is a research method that is undertaken to review research literature, using systematic and rigorous methods The method of collection information and analyzing articles and journals using systematic review was done in this study through five steps. Reviewing the study research question, searching the literature, critical appraisal of findings, data extraction, and finally data synthesis and writing. In addition, for determining the Knowledge management capabilities in the organizations, which may affect the project management success and that has been addressed by the literature in the previous section. The focus in this study is on identify the main effect of these capabilities in Project management in the organizations and discuss and elaborate what are the key points that organizations required to pay attention to in order to get a successful project management. The search was conducted in Scopus and institutional databases, and focused on journal articles that were relevant to PM and KM as practices in the organizations. Thus, the selection of keywords followed the same focus i.e. in each search, key phrases e.g. 'PM or KMCs' were developed and used with some organizations and pervious researches. Thereafter, thematic analysis of the literature was conducted to filter journal articles based on their scope of contribution and participation to the PM maturity development, Maturity models and KM capabilities. The result of the search of the scopus database and the google scholar returned 77 papers, 26 of which were redundant and 51 were relevant. These assessments were made by skimming the articles' titles, abstracts, and conclusions. A second filtering process was adopted by in-depth-reading of the articles' main body for further thematic analysis and

filtration based on focus, and categorized the articles under the classification of PM, KM, and KM capabilities.

The result from scopus database and google scholar search was that out of 51 papers, 27 were relevant. The redundancy of the papers was decided on the level of relevance to the study scope and focus, for example, some articles have a technical focus on a different scope when addressing the covered terms in this study PM and KM capabilities, which is out of scope of this study. The final total of the articles from the first and second filtering processes was 24. This paper provides an overview of the each terms in this study, definition, explanation, knowledge characteristics and conclusion. Next section provides descriptive discussion on the effect of the knowledge management capabilities on the organizational project management, which is an outcome from the literature review and identify the main characteristics for each affect that describes how that can lead to PM successful.

4. RESULTS AND DISCUSSION

Managing knowledge in projects is gaining more and more importance due to the advances in information and communication technologies and the need to deal with information overload Srikantaiah, Koenig and Al-Hawamdeh (2010). Thus, Organizations need to learn how to manage and manipulate their knowledge that they are accumulated and acquired from projects more effectively and using of best practices from lesson learned from these projects with the support of the seven capabilities of KM.

Levin and Rad (2007) stated that, KM can enhance overall PM success in terms of fulfilling the client, the performing organization, and team goals, moreover, KM has a significant effect on PM. Omotayo (2015) revealed in their conducted case studies that organizations acknowledge the roles of KM in project success. This section is mainly on the effects of KM capabilities on PM and they are discussed as blew:

PM Team Productivity

KM allows the capture and deployment of an organization's collective experience located anywhere in the business, for instance on hardcopy documents or in databases (explicit knowledge) and knowledge contained in people's minds (tacit knowledge) (Awad and Ghaziri, 2004). In PM, the most achievable result is reaching out to the final step of delivery the project with planned time and budget. Reaching this stage will not be without a realistic support by the organization KM capabilities, as each capability involves in facilitating the knowledge for the project team members, and having the knowledge on time could be a brilliant advantage to increase the PM team productivity.

For instance, organizational structure as a KM capabilities, if set up with a flexible structure which allows creating and sharing the knowledge within the organization without any obstacles or difficulties, could create positive effects of KM capability on PM. However, conversely, if this capability was not set up sufficiently, it may lead to negative effects of KM on the project specially and on the PM generally. Moreover, Polyaninova, (2011) stated that, the success or failure of projects is highly dependent upon the ability and willingness of people to identity knowledge and share it within organization.

PM Overrun Cost

Every project in the organization creates knowledge and for the same time, each project depends on knowledge to be created from. Knowledge management allows project team members to leverage rivers of the organizational knowledge management capabilities to support project objectives and ongoing project processes. One of the main effects of KM capabilities on the PM is reducing the overrun project cost through a proper planning of the KM processes capabilities. Creating, sharing, applying and protecting the organizational knowledge will be used during the project progress activities, and as well ensuring this knowledge flows through a supportable KM infrastructure consisting of organization technology, organizational structure and organizational culture (Alghail, Yao and Kie, 2017).

Whenever the organizations have these KM capabilities in place and using them at the time that knowledge is required for a single process of the project activities. It can be considered a valuable effect of KM capabilities towards the PM as avoiding delaying the knowledge will reduce the project overrun cost, unlike if the knowledge is needed and it is not available nor being facilitated by these capabilities, this will an enough reason for increasing the project budget and will impact on the project ongoing schedule. According to Polyaninova, (2011), if knowledge is not recorded and shared amongst other projects, this knowledge will be lost and no longer be available to assist future projects. This may lead to an increased cost of future projects as resources, time and money will be wasted on redefining the knowledge that once existed within the company.

PM Excellence

The use of KM in the project environment is gaining increased importance as it helps to improve the chances of a project success (Polyaninova, 2011). Therefore, achieving an excellence of PM is not an easy process, which requires more sophisticated follow-up and continuously PM evaluation from one project to another, comparing the found results for getting better improvement and considering the recommendation to improve the organizational PM. Therefore, Organizing and managing knowledge is significant because knowledge is a strategic weapon that can lead to sustained increase in profits (Rajneesh and Karamjit, 2014).

The seven KM capabilities play a significant role in affecting PM excellence. As a benchmark of excellence, whenever these capabilities are well managed in the organization, the more PM excellence the organization could obtain.

To effectively take action on these effects, it is important for organizations to realize that KM will not happen without sufficient technological resources (Robert, Rachelle and Teri, (2007) and managing these capabilities. Such KM capabilities should be dedicated to the task of making the knowledge possible and available within the organization environment. Organizations have to give a full solicitude to these KM capabilities effects, in order to retain their project management success and increasing their organizational performance. As a result, project management (PM) and knowledge management (KM) are both a necessity to lead to an improved competitive advantage for each organization (Levin and Rad, 2007).

5. CONCLUSION

This paper has presented some of the theoretical findings on KM, PM and the effects of knowledge management capabilities towards project management. From the paper, it is concluded that knowledge management capabilities have significant effects and major influences on the project management success and the degree to which the PM can reach depends on how these capabilities can be used sufficiently in the organizations. The environment and the enthusiasm of that organization encourages and determines the use of knowledge processes and knowledge infrastructure. As knowledge comes from different phases and sources during the project management activities, it is very important to have a flexible knowledge infrastructure that supports and ensures the knowledge process flow inside the organization and the infrastructure that creates, applies and protects the two types of knowledge (Tacit and Explicit). Once these processes are controlled, the organization can gain a positive effect of using knowledge management capabilities towards a successful project management environment. And failure to manage and control these capabilities may cause and effect the overall organization's business not just the project management. Finally, for gaining a successful project management practices, the organizations are highly recommended to build and monitor their KM capabilities.

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